DPP - Daily Practice Problems

Chapter-wise Sheets

MATHEMATICS CM27

SYLLABUS : Probability

Max. Marks : 100 **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 25 Questions divided into 2 parts.

Part-I contains 20 MCQs with only one correct option. Darken the correct circle/bubble in the Response Grid provided on each page.

Marking Scheme : (+4) for correct & (–1) for incorrect answer and zero for unattempted.

Part-II contains 5 Numeric/Integer type Questions. Mark your answer in the box provided in the Response Grid.

Marking Scheme : (+4) for correct & (0) for incorrect answer and zero for unattempted.

PART-I (Single Correct MCQs)

1. For k = 1, 2, 3 the box B_k contains k red balls and $(k + 1)$ white balls. Let $P(B_1)=\frac{1}{2}, P(B_2)=\frac{1}{3}$ and $P(B_3)=\frac{1}{6}$. A box is selected at random and a ball is drawn from it. If a red ball is drawn, then the probability that it has come from box B_2, is

(a) $\frac{35}{78}$

(b) $\frac{14}{39}$

(c) $\frac{10}{13}$

(d) $\frac{12}{13}$

2. If $P(A)=\frac{2}{5}$, $P(B)=\frac{3}{10}$ and $P(A\cap B)=\frac{1}{5}$, then

$P(A'|B') \cdot P(B'|A')$ is equal to

(a) $\frac{5}{6}$

(b) $\frac{5}{7}$

(c) $\frac{25}{42}$

(d) 1

3. A binomial variate X has mean = 6 and variance = 2 the probability that $5 \le X \le 7$ is

(a) $\frac{4}{2}$

(b) $\frac{1622}{6661}$

(c) $\frac{4672}{6561}$

(d) none

4. Let E^c denote the complement of an event E. Let E, F, G be pairwise independent events with P(G) > 0 and

$P(E \cap F \cap G) = 0$. Then $P(E^c \cap F^c | G)$ equals

(a) $P(E^c) + P(F^c)$

(b) $P(E^c) - P(F^c)$

(c) $P(E^c) - P(F)$

(d) $P(E) - P(F^c)$

5. Suppose X is a random variable which takes values0, 1, 2, 3, ... and $P(X = r) = pq^r$, where $0 < p < 1$, $q = 1 - p$ and r = 0, 1, 2, ... then :

(a) $P(X \ge a) = q^a$

(b) $P(X \ge a + b | X \ge a) = P(X \ge b)$

(c) $P(X = a + b | X \ge a) = P(X = b)$

(d) All of the above

6. A bag contains *n* balls. It is given that the probability that among these

n balls exactly r balls are white is proportional to r^2 ($0 \le r \le n$). A ball is drawn at random and is found to be white. Then the probability that all the balls in the bag are white, will be:

(a) $\frac{2n}{(n+1)^2}$

(b) $\frac{4n}{(n+1)^2}$

(c) $\frac{2n}{(n+3)^2}$

(d) $\frac{4n}{(n+3)^2}$

7. In a test, an examinee either guesses or copies or knows the answer to a multiple choice question with four choices. The probability that he makes a guess is $\frac{1}{3}$. The probability that he copies is $\frac{1}{6}$ and the probability that his answer is correct given that he copied it is $\frac{1}{8}$. The probability that he knew the answer to the question given that he correctly answered it, is

(a) $\frac{24}{29}$

(b) $\frac{1}{4}$

(c) $\frac{3}{4}$

(d) $\frac{1}{2}$

8. Two events E and F are independent. If P(E) = 0.3, $P(E \cup F) = 0.5$, then P(E | F) – P(F | E) equals

(a) $\frac{2}{7}$

(b) $\frac{3}{35}$

(c) $\frac{1}{70}$

(d) $\frac{1}{7}$

9. If A and B are two events such that $P(A) \neq 0$ and $P(B) \neq 1$, then $P\left(\frac{\overline{A}}{\overline{B}}\right) =$

(a) $1 - P\left(\frac{A}{B}\right)$

(b) $1 - P\left(\frac{\overline{A}}{B}\right)$

(c) $\frac{1 - P(A \cup B)}{P(\overline{B})}$

(d) $\frac{P(\overline{A})}{P(\overline{B})}$

10. Suppose X follows a binomial distribution with parameters n and p, where $0 < p < 1$, if $P(X = r)/P(X = n - r)$ is independent of n and r, then

(a) $p = \frac{1}{2}$

(b) $p = \frac{1}{3}$

(c) $p = \frac{1}{4}$

(d) none of these

11. A student appears for tests I, II and III. The student is successful if he passes either in tests I and II or tests I and IV. The probabilities of the student passing in tests I, II, III are p, q and $\frac{1}{2}$ respectively. The probability that the student is successful is $\frac{1}{2}$ then the relation between p and q is given by

(a) $pq + p = 1$
(b) $p^2 + q = 1$
(c) $pq - 1 = p$
(d) None of these

12. A man takes a step forward with probability 0.4 and backward with probability 0.6. The probability that at the end of eleven steps he is one step away from the starting point is

(a) $\frac{2^5.3^5}{5^{10}}$
(b) $462\times\left(\frac{6}{25}\right)^5$
(c) $231\times\frac{3^5}{5^{10}}$
(d) None of these

13. If E_1 and E_2 are two events such that $P(E_1) = 1/4, P(E_2/E_1) = 1/2$ and $P(E_1/E_2) = 1/4$, then choose the incorrect statement.

(a) E_1 and E_2 are independent
(b) E_1 and E_2 are exhaustive
(c) E_2 is twice as likely to occur as E_1
(d) Probabilities of the events $E_1 \cap E_2$, E_1 and E_2 are in G.P.

14. If X and Y are independent binomial variates $B\left(5,\frac{1}{2}\right)$ and $B\left(7,\frac{1}{2}\right)$, then P (X + Y = 3) is

(a) $\frac{35}{47}$
(b) $\frac{55}{1024}$

(c) $\frac{220}{512}$

(d) $\frac{11}{204}$

15. If X follows a binomial distribution with parameters n = 8 and p = $\frac{1}{2}$, then $P(|X-4|\leq 2)$ is

(a) $\frac{119}{128}$

(b) $\frac{119}{228}$

(c) $\frac{19}{128}$

(d) $\frac{18}{128}$

16. A bag contains 4 red and 4 blue balls. Four balls are drawn one by one from the bag, then find the probability that the drawn balls are in alternate colour.

(a) $\frac{35}{6}$

(b) $\frac{2}{35}$

(c) $\frac{3}{35}$

(d) $\frac{6}{35}$

17. If X is a Poisson variate such that P(X = 1) = P (X = 2), then P (X = 4) is equal to

(a) $\frac{1}{2e^2}$

(b) $\frac{1}{3e^2}$

(c) $\frac{2}{3e^2}$

(d) $\frac{1}{e^2}$

18. 3% of the electric bulbs manufactured by a company are defective. Using Poisson distribution (approximation), the probability that a sample of 100 bulbs will contain exactly one defective, is

(a) .05

(b) .15

(c) e^{-1}

(d) e^{-2}

(Given antilog (.1742) = 1.5)

19. Suppose that the probability that an item produced by a particular machine is defective equals 0.2. If 10 items produced from this machine are selected at random, the probability that not more than one defective is found is

(a) $\frac{1}{e^2}$

(b) $\frac{2}{e^2}$

(c) $\frac{3}{e^2}$

(d) none of these

20. A and B are two independent witnesses (i.e. there is no collision between them) in a case. The probability that A will speak the truth is x and the probability that B will speak the truth is y. A and B agree in a certain statement. The probability that the statement is true is

(a) $\frac{x-y}{x+y}$

(b) $\frac{xy}{1+x+y+xy}$

(c) $\frac{x-y}{1-x-y+2xy}$

(d) $\frac{xy}{1-x-y+2xy}$

PART-II (Numeric/Integer Type Questions)

21. If two events A and B are such that $P(\overline{A})=0.3, P(B)=0.4$ and $P(A\cap\overline{B})=0.5$ then $P\left(\frac{B}{A\cup\overline{B}}\right)=$

22. A bag contains three white, two black and four red balls. If four balls are drawn at random with replacement. If the probability that the sample contains just one white ball is $\frac{a}{b}$, then ab =

23. The probability of a man hitting a target is $\frac{2}{5}$. He fires at the target *k* times (*k*, a given number). Then the minimum *k*, so that the probability of hitting the target at least once is more than $\frac{7}{10}$, is :

24. A random variable *X* has the probability distribution

X	1	2	3	4	5	6	7	8
p(X)	0.15	0.23	0.12	0.10	0.20	0.08	0.07	0.05

For the events E = {X is a prime number} and $F=\{X<4\}$, then $P(E\cup F)$ is

25. The probability of India winning a test match against Westindies is $\frac{1}{2}$ assuming independence from match to match the probability that in a 5 match series India's second win occurs at the third test, is

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 27 - MATHEMATICS			
Total Questions	25	Total Marks	100
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	27	Qualifying Score	43
Success Gap = Net Score – Qualifying Score			
Net Score = [(Correct × 4) – (Incorrect × 1)] *for part-I* + [(correct × 4)] *for part-II*			